Di Bartolomeo, Giovanni; Acocella, Nicola

Working Paper

Tinbergen and Theil Meet Nash: Controllability in Policy Games

Nota di Lavoro, Fondazione Eni Enrico Mattei, No. 132.2005

Provided in Cooperation with:
Fondazione Eni Enrico Mattei (FEEM)

Suggested Citation: Di Bartolomeo, Giovanni; Acocella, Nicola (2005) : Tinbergen and Theil Meet Nash: Controllability in Policy Games, Nota di Lavoro, Fondazione Eni Enrico Mattei, No. 132.2005

This Version is available at:
http://hdl.handle.net/10419/74181

Terms of use:
Documents in EconStor may be saved and copied for your personal and scholarly purposes.
You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.
If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.
Tinbergen and Theil Meet Nash: Controllability in Policy Games
Giovanni Di Bartolomeo
and Nicola Acocella
NOTA DI LAVORO 132.2005

NOVEMBER 2005
ETA – Economic Theory and Applications

Giovanni Di Bartolomeo and Nicola Acocella, University of Rome I

This paper can be downloaded without charge at:
The Fondazione Eni Enrico Mattei Note di Lavoro Series Index:
http://www.feem.it/Feem/Pub/Publications/WPapers/default.htm
Social Science Research Network Electronic Paper Collection:
http://ssrn.com/abstract=849025

The opinions expressed in this paper do not necessarily reflect the position of
Fondazione Eni Enrico Mattei
Corso Magenta, 63, 20123 Milano (I), web site: www.feem.it, e-mail: working.papers@feem.it
Tinbergen and Theil Meet Nash: Controllability in Policy Games

Summary
This paper generalizes the classical theory of economic policy to a static LQ-strategic context between n players. We show how this generalized version of controllability can profitably be used to deal with policy ineffectiveness issues and Nash equilibrium existence.

Keywords: Policy games, policy ineffectiveness, static controllability, Nash equilibrium existence

JEL Classification: C72, E52, E61

We are grateful to G. Ciccarone, J. Engwerda, T. Gylfason, D.A. Hibbs, R. Neck, J. Plasmans for useful discussions and comments on an earlier seminal draft. We also thank J. Capaldo for his assistance.

Address for correspondence:
Giovanni Di Bartolomeo
Public Economics
University of Rome I
Via del Castro Laurenziano 9
00161 Rome
Italy
Phone: +39 0 64976 6329
Fax: +39 0 6446 2040
E-mail: giovanni.dibartolomeo@uniroma1.it
1. Introduction

In the last decade or so issues of effectiveness for specific policy instruments have been raised within the context of static policy games since the pioneering articles of Stokey (1990) and Gylfason and Lindbeck (1994) who generalize the rational expectations models à la Sargent and Wallace (1975) by explicitly modelling private sector strategies. In particular, explicitly or implicitly formal conditions leading to monetary policy ineffectiveness – or neutrality – have been investigated in some of the papers mentioned. Such conditions appear significantly different from those stated in the classical analysis of policy effectiveness and controllability, initially formulated by Jan Tinbergen and Henri Theil.

We aim to show how the classical theory of economic policy can deal with policy ineffectiveness and Nash equilibrium existence issues by extending it from a single decision-maker context to a strategic multi-player one. For the sake of simplicity, we limit ourselves to the common LQ-games in a perfect information static context. Our simple logic can be extended to more complex frameworks.

2. The Model

We consider an economy where \( n \) players interact. We assume that each player minimizes a LQ-criterion. For reasons that will be clear later, we find it useful to distinguish between the targets that enter the criterion only linearly and the others. By assuming that player \( i \)'s criterion is defined over \( \ell(i) = q(i) + l(i) \) variables, where \( l(i) \) is the number of those that enter only linearly and \( q(i) \) is the number of other target variables, the LQ-criterion can be formally written as:

\[
U_i = \frac{1}{2} \left( y_i - \bar{y}_i \right)' Q_i \left( y_i - \bar{y}_i \right) + y_i'R_i + \bar{y}_i'L_i \quad \forall i \in N
\]

where \( N \) is the set of the \( n \) players; \( y_i \in \mathbb{R}^{q(i)} \) is a vector of target variables that enter equation (1) at least in a quadratic manner (second order); \( \bar{y}_i \in \mathbb{R}^{q(i)} \) is a vector of target

\[1\] See the papers surveyed in Cukierman (2004) and Acocella and Di Bartolomeo (2004).

\[2\] See, among others, Preston and Pagan (1982: Chapters 1-3) and Hughes Hallett (1989).

\[3\] For reasons that we shall clarify we keep targets and instruments formally separate. However, in order to take account of the costs of some instruments, we could simply introduce additional targets into equation (1) as well as equality constraints between them and the instruments into equation (2) below.
values; $\bar{y}_i \in \mathbb{R}^{(i)}$ is a vector of target variables that enter only linearly (first order); $Q_i$ is an appropriate diagonal matrix, $R_i$ and $L_i$ are appropriate vectors. Note that $Q_i$ is a full rank square matrix by assumption. We refer to $\bar{y}_i$, $Q_i$, $R_i$ and $L_i$ as the parameters of player $i$’s criterion. Notice that player $i$’s first best (or optimum optimorum) corresponds to its target values only if $R_i = 0$.

All the control vectors are sub-vectors of $u \in \mathbb{R}^M$ and all the target variable vectors are sub-vectors of $y \in \mathbb{R}^K$. Each player $i$ controls a sub-vector of $u$, i.e. $u_i \in \mathbb{R}^{m(i)}$. Of course, $\sum_{i \in N} m(i) = M$, since a control cannot be set by more than one player by definition. For the sake of simplicity, we also assume that each player cannot control more instruments than its targets, i.e. $m(i) \leq t(i)$. By contrast, players can share some target variables. Thus $\sum_{i \in N} t(i) \geq K$. The $K$ target variables are linked together by the following linear equation system:

$$(2) \quad y = Au + F.$$ 

Each line of the above equation system represents a linear relation between one target and the instrument vector $u$. Vector $F \in \mathbb{R}^K$ is a vector of given constants that are outside the players’ control.\(^4\) To keep things simple, we assume that the basis of $A$ is the identity matrix, which means that system (2) cannot be reduced to many independent sub-systems.\(^5\)

From equation (2), we can extract $y_i$ and $\bar{y}_i$, obtaining the relevant sub-system for player $i$:

$$(3) \quad \begin{bmatrix} y_i \\ \bar{y}_i \end{bmatrix} = \begin{bmatrix} C_i \\ \bar{C}_i \end{bmatrix} u_i + \sum_{j \in N, j \neq i} \begin{bmatrix} E_{y,j} \\ \bar{E}_{y,j} \end{bmatrix} u_j + F_i.$$ 

\(^4\) It can also contain i.i.d. shocks. In this case our results hold in expected terms by the certainty-equivalence principle.

\(^5\) This assumption can be relaxed by introducing the concept of sub-controllability, which enables us to generalize our results to a larger class of policy-games (see Acocella and Di Bartolomeo, 2005). However, since the generalization adds nothing to the basic mechanism that this paper aims to illustrate, we do not consider it here.
where $C_i \in \mathbb{R}^{q(i)\times m(i)}$, $\tilde{C}_i \in \mathbb{R}^{l(i)\times m(i)}$, $E_y \in \mathbb{R}^{q(i)\times m(j)}$, $\tilde{E}_y \in \mathbb{R}^{l(i)\times m(j)}$, and $F_i \in \mathbb{R}^{l(i)}$ are appropriate matrices and vector.

We begin by introducing the definitions of controllability (in the Tinbergen-Theil’s fashion\textsuperscript{6}) and policy ineffectiveness.

**Definition (Q-controllability):** Player $i$ can Q-control system (3) if the number of its instruments equals the number of its quadratic targets: $m(i) = q(i)$. If policy-maker $i$ can Q-control its system, $y_i \in \mathbb{R}^{q(i)}$ is its controllable set.

The above definition implies that in the static single-player case ($n = 1$), the decision-maker is able to obtain its first best. In fact, if $m(i) = t(i) > q(i)$, a finite solution for the problem does not exist.\textsuperscript{7} It is worth noticing that Q-controllability implies that $C_i$ is a square matrix.

**Definition (ineffectiveness):** Player $i$’s policy is ineffective with respect to one (or more of its) target variable(s) if the equilibrium value of that (those) variable(s) is never affected by changes in the parameters of the player’s criterion.\textsuperscript{8}

The Nash equilibrium can be decoupled in a set of $n$ traditional Tinbergen-Theil problems (i.e. minimizing equation (1) subject to (3) for each of the $n$ players), which is the set of the reaction correspondences. With reference to this decoupled representation of the policy game, we can state the following theorem.

**Theorem 1 (existence):** The Nash equilibrium of the policy game described does not exist if and only if (a) for at least one player: $L_i \neq 0$ and $t(i) = m(i)$; or (b) the intersection of players’ controllable sets is not empty.

Proof. The optimization problem of each player implies the following $n$ focs:

$$
\frac{\partial U_i}{\partial u_i} = C_i^t Q_i C_i u_i + C_i^t Q_i \sum_{j \in N \setminus i} E_{ij} u_j + C_i^t (R_i + L_i - Q_i \eta_i + Q_i F_i) = 0 \quad \forall i \in N.
$$

\textsuperscript{6}Our definition slightly differs from that used in the traditional theory of economic policy because it is instrumental to our aim. However, notice that the traditional case is a particular case of our definition (i.e. $t(i) = q(i)$). See Preston and Pagan (1982: Chapters 1-3).

\textsuperscript{7}The first best implies infinite values of the variables that enter the criterion linearly.

\textsuperscript{8}In a strategic context policies are endogenous. Thus ineffectiveness must be formulated in endogenous terms too.
Now, let us consider the case of player 1 without loss of generality and assume that 
\( m(1) = t(1) > q(1) \) and that a solution \( (u^*_1, u^*_1) \) exists—where \( u^*_j \) represents the controls of all the players other than player one. If \( (u^*_1, u^*_1) \) is the solution, given \( u^*_j, u^*_i \) must satisfy the first order condition (4) for player 1, but no finite value of \( u_i \) could, since 
\[
\det (C_i'Q_iC_i) = 0 \text{ (thus, cannot be inverted) if } m(1) = t(1) > q(1). \tag{9}
\]
Let us consider the second part of the theorem focusing on the first two players without any loss of generality. Assume that they share all their variables and Q-control their sub-systems and assume that a solution \( (u^*_1, u^*_2, u^*_1) \) exists. Then given \( u^*_j, (u^*_1, u^*_2) \) must satisfy the system of first-order conditions of the first two players, i.e.:

\[
(5) \begin{bmatrix}
C_i'Q_iC_i & C_i'Q_iE_{12} \\
C_i'Q_iE_{21} & C_i'Q_iC_2
\end{bmatrix}
\begin{bmatrix}
u^*_1 \\
u^*_2
\end{bmatrix}
= \begin{bmatrix}
C_i'Q_i \sum_{j \in \mathbb{N}\setminus\{1,2\}} E_j u^*_j + C_i' \left( R_i + L_i - Q_i \bar{y}_i + Q_i F_i \right) \\
C_i'Q_2 \sum_{j \in \mathbb{N}\setminus\{1,2\}} E_j u^*_j + C_i' \left( R_2 + L_2 - Q_2 \bar{y}_2 + Q_2 F_2 \right)
\end{bmatrix}
\]

However, the first matrix of (5) cannot be inverted since, according to our assumptions, 
\( C_1 = E_{21} \) and \( C_2 = E_{12} \). Hence no \( (u^*_1, u^*_2) \) can satisfy (5) and \( (u^*_1, u^*_2, u^*_1) \) cannot be the solution. Finally, consider the case where the first two players do not share all their targets. It can be simply solved by considering the problem of each player as two independent problems: a) minimize linear-quadratic deviations from shared targets plus all first-order targets with respect to an arbitrary set of instruments of a number equal to the quadratic variables; b) minimize linear-quadratic deviations from non-shared targets plus all first-order targets with respect to the other instruments (which equal the targets because of the Q-controllability).\(^{10}\) As above, now the impossibility of a solution emerges for the first-order condition of the problems a). Summarizing, as claimed, if at

\[\text{9 In such a case, } Q_i \text{ equals } T_i T_i' \text{ where } T_i = \begin{bmatrix} \sqrt{Q_i} & O \end{bmatrix} \in \mathbb{R}^{q(1)\times(q(1))}, \text{ i.e. } T_i \text{ is obtained in two steps: first by considering a } q(1)\times q(1) \text{ matrix with the square roots of each element } Q_i \text{ and then by adding } I(i) \text{ columns of zeros. Thus } \det(C_i'T_i'C_i) = \det(C_i'T_i) \det(T_i'C_i) \text{ equals zero since it is easy to verify that all the elements of the last } I(i) \text{ columns of } C_i'T_i \text{ are zeros.}\]

\[\text{10 Notice that because of the controllability the result is independent of the assignment of the instruments.}\]
least two players Q-control their sub-systems and share at least one target variable (and thus the player controllable set is not empty), the Nash equilibrium does not exist.

In an unusual way, we have derived the necessary and sufficient condition for the existence of the Nash equilibrium in terms of a counting rule of the number of instruments and targets. It is then useful to compare our results with a well-known theorem of the existence of Nash equilibrium.

In an LQ-context, a sufficient condition for the Nash equilibrium existence\textsuperscript{11} is that the space of strategies of each player is convex and compact. If players’ controls are unbounded, the Nash equilibrium may not exist. The introduction of quadratic instrument costs\textsuperscript{12} would make them bounded, thus assuring the existence of equilibrium. In our terms, this would imply that the dimensions of matrices $Q_i$ become $t(i) + m(i)$. Thus, the number of instruments would always be less than the number of targets, the system would not be Q-controllable by any player and equilibrium would exist. Note, however, that Theorem 1 is more general than the theorem of existence, mentioned since that of instrument costs is a particular case.

Once the Nash equilibrium is decoupled into a set of $n$ traditional Tinbergen-Theil problems, provided that equilibrium exists, player $i$’s policy is ineffective with respect to the targets shared with the players who perfectly Q-control their sub-systems. A straightforward condition for policy ineffectiveness can thus be defined as follows.

**Theorem 2 (ineffectiveness):** Player $i$’s policy is ineffective for all the target variables contained in the complement of the intersection between its controllable set and the union of all players’ controllable sets.

Proof. Focu in terms of quasi-reaction functions are:

\begin{equation}
\frac{\partial U}{\partial u_i} = C_i'Q_i(y_i - \overline{y}_i) + C_i'R_i + \tilde{C}_i'L_i = 0 \quad \forall i \in N
\end{equation}

Equations (6) represent the optimal value of the target variables that assure the minimization of player $i$’s criterion, given the policy of the others. Thus, by definition, all the conditions (6) have to be mutually verified to ensure the Nash equilibrium.

\textsuperscript{11} See e.g. Dasgupta and Maskin (1986).

\textsuperscript{12} See footnote 3.
Formally, equations (6) map the vector of target variables into that of the desired target values. If player $i$ can Q-control its sub-system, then condition (6) becomes:

$$y_i = \bar{y}_i - Q_i^{-1}R_i - \left(C_i'Q_i\right)^{-1}C_i'L_i$$  \hspace{1cm} (7)

If the Nash equilibrium exists, it is unique, because of the LQ-structure considered. Hence, if the equilibrium exists and player $i$ can Q-control its sub-system, the Nash equilibrium will satisfy equation (7) and any other player will not be able to affect the value of any of the variables in $y_i$, i.e. those in the controllable set of player $i$. □

Finally, we should note that neutrality (for the players different from $i$) associated with $l(i) \neq 0$ differs from that emerging in the case of $l(i) = 0$. The former is somewhat weaker than the latter. In fact, if $l(i) = 0$ player $i$ is the only one that can influence its targets and it always achieves its first best. By contrast, if $l(i) \neq 0$, despite the fact that only player $i$ can influence its targets, it does not achieve its first best and can thus improve its position, e.g. by using the first mover advantage in Stackelberg games or by cooperating.  

3. Conclusions

In this paper we have first generalized the conditions for policy controllability from a parametric context to a strategic multi-player one. Once static controllability has been reinterpreted to suit the strategic nature of the setting, policy ineffectiveness merely becomes an instrument/target accounting problem in the traditional Tinbergen-Theil’s vein. In a game theoretical perspective, controllability and ineffectiveness are in fact dual concepts: controllability of the system for one player implies that other players’ strategies (instruments) are ineffective. A problem of existence of the Nash equilibrium can arise, when more than one player sharing at least a common target apparently control the system and their controls are unbounded.

---

13 It is worth noticing that for each player condition (6) represents the dual problem of that described by equation (4). If the reaction function system (4) is over-determined, the quasi-reaction function system is under-determined; and vice versa.

14 See Acocella and Di Bartolomeo (2004 and 2005) for some examples.
The simple logic of our discussion can be extended to more complex contexts such as dynamic and non-linear ones. However, formal generalizations may face computational and practical problems.

References


NOTE DI LAVORO DELLA FONDAZIONE ENI ENRICO MATTEI

Fondazione Eni Enrico Mattei Working Paper Series

Our Note di Lavoro are available on the Internet at the following addresses:
http://www.feem.it/Feem/Pub/Publications/WPapers/default.html
http://www.repec.org

NOTE DI LAVORO PUBLISHED IN 2004

IEM 1.2004 Anil MARKANDYA, Suzette PEDROSO and Alexander GOLUB: Empirical Analysis of National Income and So2 Emissions in Selected European Countries

ETA 2.2004 Masahisa FUJITA and Shlomo WEBER: Strategic Immigration Policies and Welfare in Heterogeneous Countries

PRA 3.2004 Adolfo DI CARLUCCIO, Giovanni FERRI, Cecilia FRALE and Ottavio RICCHI: Do Privatizations Boost Household Shareholding? Evidence from Italy

ETA 4.2004 Victor GINSBURGH and Shlomo WEBER: Languages Disenfranchisement in the European Union


PRA 7.2004 Sandro BRUSCO, Giuseppe LOPOMO and S. VISWANATHAN (lxv): Merger Mechanisms

PRA 8.2004 Wolfgang AUSSENNEGG, Pegaret PICHLER and Alex STOMPER (lxv): IPO Pricing with Bookbuilding, and a When-Issued Market

PRA 9.2004 Pegaret PICHLER and Alex STOMPER (lxv): Primary Market Design: Direct Mechanisms and Markets


PRA 11.2004 Bjarne BRENDSTRUP and Harry J. PAARSCH (lxv): Nonparametric Identification and Estimation of Multi-Unit, Sequential, Oral, Ascending-Price Auctions With Asymmetric Bidders

PRA 12.2004 Ohad KADAN (lxv): Equilibrium in the Two Player, k-Double Auction with Affiliated Private Values

PRA 13.2004 Maarten C.W. JANSEN (lxv): Auctions as Coordination Devices

PRA 14.2004 Gadi FIBICH, Arieh GAVIOUS and Aner SELA (lxv): All-Pay Auctions with Weakly Risk-Averse Buyers

PRA 15.2004 Orly SADE, Charles SCHNITZLEIN and Jaime F. ZENDER (lxv): Competition and Cooperation in Divisible Good Auctions: An Experimental Examination

CCMP 16.2004 Marta STRYZSOWSKA (lxvii): Late and Multiple Bidding in Competing Second Price Internet Auctions

CCMP 17.2004 Slim Ben YOUSSEF: R&D in Cleaner Technology and International Trade

NRM 18.2004 Angelo ANTOCI, Simone BORGHESI and Paolo RUSSU (lxvi): Biodiversity and Economic Growth: Stabilization Versus Preservation of the Ecological Dynamics

SIEV 19.2004 Anna ALBERINI, Paolo ROSATO, Alberto LONGO and Valentina ZANATTA: Information and Willingness to Pay in a Contingent Valuation Study: The Value of S. Erasmo in the Lagoon of Venice


NRM 21.2004 Jacqueline M. HAMILTON (lxvii): Climate and the Destination Choice of German Tourists


NRM 23.2004 Pius ODUNGA and Henk FOLMER (lxvii): Profiling Tourists for Balanced Utilization of Tourism-Based Resources in Kenya


NRM 26.2004 Juan Luis EUGENIO-MARTÍN, Noelia MARTÍN MORALES and Riccardo SCARPA (lxvii): Tourism and Economic Growth in Latin American Countries: A Panel Data Approach

NRM 27.2004 Raúl Hernández MARTÍN (lxvii): Impact of Tourism Consumption on GDP. The Role of Imports


NRM 29.2004 Marian WEBER (lxvii): Assessing the Effectiveness of Tradable Landuse Rights for Biodiversity Conservation: An application to Canada’s Boreal Mixedwood Forest

NRM 30.2004 Trond BJØRNDAL, Phoebe KOUNDOURI and Sean PASCOE (lxvii): Output Substitution in Multi-Species Trawl Fisheries: Implications for Quota Setting


CTN 33.2004 Wilson PEREZ: Divide and Conquer: Noisy Communication in Networks, Power, and Wealth Distribution


**KTHC 36.2004**

Franca ECKERT COEN and Claudio ROSSI (lxviii): *Foreigners, Immigrants, Host Cities: The Policies of Multi-Ethnicity in Rome. Reading Governance in a Local Context*

**KTHC 37.2004**

Kristine CRANE (lxviii): *Governing Migration: Immigrant Groups’ Strategies in Three Italian Cities – Rome, Naples and Bari*

**KTHC 38.2004**

Kiflemariam HAMDE (lxviii): *Mind in Africa, Body in Europe: The Struggle for Maintaining and Transforming Cultural Identity - A Note from the Experience of Eritrean Immigrants in Stockholm*

**ETA 39.2004**

Alberto CAVALIERE: *Price Competition with Information Disparities in a Vertically Differentiated Duopoly*

**PRA 40.2004**

Andrea BIGANO and Stef PROOST: *The Opening of the European Electricity Market and Environmental Policy: Does the Degree of Competition Matter?*

**CCMP 41.2004**

Michael PIANUS (lxv): *International Cooperation to Resolve International Pollution Problems*

**KTHC 42.2004**

Francesco CRESP: *Notes on the Determinants of Innovation: A Multi-Perspective Analysis*

**CTN 43.2004**

Sergio CURRARINI and Marco MARINI: *Coalition Formation in Games without Synergies*

**CTN 44.2004**

Marc ESCRIHUELA-VILLAR: *Cartel Sustainability and Cartel Stability*

**NRM 45.2004**

Sebastian BEROYETS and Nicolas GRAVEL (lxvi): *Appraising Diversity with an Ordinal Notion of Similarity: An Axiomatic Approach*

**NRM 46.2004**

Signe ANTHON and Bo JELLEMARK THORSEN (lxvi): *Optimal Afforestation Contracts with Asymmetric Information on Private Environmental Benefits*

**NRM 47.2004**


**NRM 48.2004**

Ekin BIROL, Agnes GYOVAI and Melinda SMALE (lxvi): *Using a Choice Experiment to Value Agricultural Biodiversity on Hungarian Small Farms: Agri-Environmental Policies in a Transition al Economy*

**CCMP 49.2004**

Gernot KLEPPER and Sonja PETERSON: *The EU Emissions Trading Scheme: Allowance Prices, Trade Flows, Competitiveness Effects*

**GG 50.2004**

Scott BARRETT and Michael HOEL: *Optimal Disease Eradication*

**CTN 51.2004**

Dinko DIMITROV, Peter BORM, Ruud HENDRICKX and Shao CHIN SUNG: *Simple Priorities and Core Stability in Hedonic Games*

**SIEV 52.2004**

Francesco RICC: *Channels of Transmission of Environmental Policy to Economic Growth: A Survey of the Theory*

**SIEV 53.2004**

Anna ALBERINI, Maureen CROPPER, Alan KRUPNICK and Nathalie B. SIMON: *Willingness to Pay for Mortality Risk Reductions: Does Latency Matter?*

**NRM 54.2004**

Conservation: *An Integrated Hydrological and Economic Model to Value the Enhanced Nitrogen Retention in Renaturalized Streams*

**NRM 55.2004**

Timo GOESCHL and Tun LIN (lxvi): *Biodiversity Conservation on Private Lands: Information Problems and Regulatory Choices*

**NRM 56.2004**

Tom DEDEURWAERDERE (lxvi): *Bioprospection: From the Economics of Contracts to Reflexive Governance*

**CCMP 57.2004**

Katrin REHDANZ and David MADDISON: *The Amenity Value of Climate to German Households*

**CCMP 58.2004**

Koen SMEKENS and Bob VAN DER ZWAAN: *Environmental Externalities of Geological Carbon Sequestration Effects on Energy Scenarios*

**NRM 59.2004**

Valentina BOSETTI, Mariaester CASSINELLI and Alessandro LANZA (lxvii): *Using Data Envelopment Analysis to Evaluate Environmentally Conscious Tourism Management*

**NRM 60.2004**

Timo GOESCHL and Danilo CAMARGO IGLIORI (lxvi): *Property Rights Conservation and Development: An Analysis of Extractive Reserves in the Brazilian Amazon*

**CCMP 61.2004**

Barbara BUCHNER and Carlo CARRARO: *Economic and Environmental Effectiveness of a Technology-based Climate Protocol*

**NRM 62.2004**

Elissaios PAPYRAKIS and Reyer GERLAGH: *Resource-Abundance and Economic Growth in the U.S.*

**NRM 63.2004**

Györgyi BELA, György PATAKI, Melinda SMALLE and Mariann HAJDÚ (lxvi): *Conserving Crop Genetic Resources on Smallholder Farms in Hungary: Institutional Analysis*

**NRM 64.2004**

E.C.M. RUJGROK and E.E.M. NILLESEN (lxvi): *The Socio-Economic Value of Natural Riverbanks in the Netherlands*

**NRM 65.2004**


**ETA 66.2004**

Giannis VARDAS and Anastasios XEPAPADEAS: *Uncertainty Aversion, Robust Control and Asset Holdings*

**GG 67.2004**

Anastasios XEPAPADEAS and Constadina PASSA: *Participation in and Compliance with Public Voluntary Environmental Programs: An Evolutionary Approach*

**GG 68.2004**

Michael FINUS: *Modesty Pays: Sometimes!*

**NRM 69.2004**

Trond BJØRNDAL and Ana BRASÃO: *The Northern Atlantic Bluefin Tuna Fisheries: Management and Policy Implications*

**CTN 70.2004**

Alejandro CAPARRÓS, Abdelhakim HAMMOUDI and Tarik TAZDAÏT: *On Coalition Formation with Heterogeneous Agents*

**IEM 71.2004**

Massimo GIOVANNINI, Margherita GRASSO, Alessandro LANZA and Matteo MANERA: *Conditional Correlations in the Returns on Oil Companies Stock Prices and Their Determinants*

**IEM 72.2004**

Alessandro LANZA, Matteo MANERA and Michael MCALEER: *Modelling Dynamic Conditional Correlations in WTI Oil Forward and Futures Returns*

**SIEV 73.2004**

Margherita GENIUS and Elisabetta STRAZZERA: *The Copula Approach to Sample Selection Modelling: An Application to the Recreational Value of Forests*
CCMP 74.2004 Rob DELLINK and Ekko van IERLAND: Pollution Abatement in the Netherlands: A Dynamic Applied General Equilibrium Assessment

ETN 75.2004 Rosella LEVAGGI and Michele MORETTO: Investment in Hospital Care Technology under Different Purchasing Rules: A Real Option Approach


CTN 77.2004 Alex ARENAS, Antonio CABRALES, Albert DÍAZ-GUILERA, Roger GUIMERÀ and Fernando VEGA-REDONDO (lxx): Optimal Information Transmission in Organizations: Search and Congestion

CTN 78.2004 Francis BLOCH and Armando GOMES (lxx): Contracting with Externalities and Outside Options

CTN 79.2004 Rabah AMIR, Efrosyni DIAMANTOUDI and Lichiu XUE (lxx): Merger Performance under Uncertain Efficiency Gains

CTN 80.2004 Francis BLOCH and Matthew O. JACKSON (lxx): The Formation of Networks with Transfers among Players

CTN 81.2004 Daniel DIERMEIER, Hulya ERASLAN and Antonio MERLO (lxx): Bicameralism and Government Formation

CTN 82.2004 Rod GARRATT, James E. PARCO, Cheng-ZHONG QIN and Amnon RAPOPORT (lxx): Potential Maximization and Coalition Government Formation

CTN 83.2004 Kfir ELIAZ, Debraj RAY and Ronny RAZIN (lxx): Group Decision-Making in the Shadow of Disagreement

CTN 84.2004 Sanjeev GOTAL, Marco van der LEIJ and José Luís MORAGA-GONZÁLEZ (lxx): Economics: An Emerging Small World?

CTN 85.2004 Edward CARTWRIGHT (lxx): Learning to Play Approximate Nash Equilibria in Games with Many Players

IEM 86.2004 Finn R. FÖRSUND and Michael HOEL: Properties of a Non-Competitive Electricity Market Dominated by Hydroelectric Power

KTHC 87.2004 Elistasios PAPYRakis and Reyer GERLAGH: Natural Resources, Investment and Long-Term Income


IEM 89.2004 A. MARKANDYA, S. PEDROSO and D. STREMIKIE: Energy Efficiency in Transition Economies: Is There Convergence Towards the EU Average?

GG 90.2004 Rolf GOLOMBEK and Michael HOEL: Climate Agreements and Technology Policy

PRA 91.2004 Sergei IZMALKOV (lxx): Multi-Unit Open Ascending Price Efficient Auction

KTHC 92.2004 Gianmarco I.P. OTTAVIANO and Giovanni PERI: Cities and Cultures

KTHC 93.2004 Massimo DEL GAITTO: Agglomeration, Integration, and Territorial Authority Scale in a System of Trading Cities, Centralisation versus Devolution

CCMP 94.2004 Pierre-André JOUVEt, Philippe MICHEL and Gilles ROTIlLOn: Equilibrium with a Market of Permits

CCMP 95.2004 Energy Supply

CCMP 96.2004 Francesco BOSELLO, Marco LAZZARIN, Roberto ROSON and Richard S.J. TOL: Economy-Wide Estimates of the Implications of Climate Change: Sea Level Rise

CTN 97.2004 Gustavo BERGANTINOS and Juan J. VIDAL-PUGA: Defining Rules in Cost Spanning Tree Problems Through the Canonical Form

CTN 98.2004 Siddhartha BANDYOPADHYAY and Mandar OAK: Party Formation and Coalitional Bargaining in a Model of Proportional Representation

GG 99.2004 Hans-Peter WEIKARD, Michael FINUS and Juan-Carlos ALTAMIRANO-CABRERA: The Impact of Surplus Sharing on the Stability of International Climate Agreements

SIEV 100.2004 Chiara M. TRAVISI and Peter NJIKAMP: Willingness to Pay for Agricultural Environmental Safety: Evidence from a Survey of Milan, Italy, Residents


NRM 102.2004 Valentino BOSETTI and David TOMBERLIN: Real Options Analysis of Fishing Fleet Dynamics: A Test

CCMP 103.2004 Alessandra GORIA e Gretel GAMBARELLI: Economic Evaluation of Climate Change Impacts and Adaptability in Italy


PRA 106.2004 Kira BÖRNER: The Political Economy of Privatization: Why Do Governments Want Reforms?

PRA 107.2004 Pehr-Johan NORBACK and Lars PERSson: Privatization and Restructuring in Concentrated Markets

SIEV 108.2004 Angela GRANZOTT, Fabio PRANOVI, Simone LIBRALATO, Patrizia TORRICELLI and Danilo MAINARDI: Comparison between Artisanal Fishery and Manila Clam Harvesting in the Venice Lagoon by Using Ecosystem Indicators: An Ecological Economics Perspective

CTN 109.2004 Somdeb LAHIRE: The Cooperative Theory of Two Sided Matching Problems: A Re-examination of Some Results

NRM 110.2004 Giuseppe DI VITA: Natural Resources Dynamics: Another Look

SIEV 111.2004 Anna ALBERINI, Alistair HUNt and Anil MARKANDYA: Willingness to Pay to Reduce Mortality Risks: Evidence from a Three-Country Contingent Valuation Study

KTHC 112.2004 Valeria PAPPONETTI and Dino PINELLI: Scientific Advice to Public Policy-Making

SIEV 113.2004 Paulo A.L.D. NUNES and Laura ONOFRI: The Economics of Warm Glow: A Note on Consumer’s Behavior and Public Policy Implications


Valeria COSTANTINI and Francesco GRACCEVA: Social Costs of Energy Disruptions
Christian EGENHOFER, Kyriakos GIALOGLOU, Giacomo LUCIANI, Maroeka BOOTS, Martin SCHEEPERS,
Valeria COSTANTINI, Francesco GRACCEVA, Anil MARKANDYA and Giorgio VICINI: Market-Based Options for Security of Energy Supply
David FISK: Transport Energy Security. The Unseen Risk?
Giacomo LUCIANI: Security of Supply for Natural Gas Markets. What is it and What is it not?
L.J. de VRIES and R.A. HAKVOORT: The Question of Generation Adequacy in Liberalised Electricity Markets
Alberto PETRUCCI: Asset Accumulation, Fertility Choice and Nondegenerate Dynamics in a Small Open Economy
Carlo GIUPPONI, Jaroslav MYSIAK and Anita FASSIO: An Integrated Assessment Framework for Water Resources Management: A DSS Tool and a Pilot Study Application
Paul MENSINK: Instant Efficient Pollution Abatement Under Non-Linear Taxation and Asymmetric Information: The Differential Tax Revisited
Mauro FABIANO, Gabriella CAMARSA, Rosanna DURSI, Roberta VALDÌ, Valentina MARIN and Francesca PALMISANI: Integrated Environmental Study for Beach Management: A Methodological Approach
Irene GROSFELD and Iraj HASHI: The Emergence of Large Shareholders in Mass Privatized Firms: Evidence from Poland and the Czech Republic
Maria BERRITTELLA, Andrea BIGANO, Roberto ROSON and Richard S.J. TOL: A General Equilibrium Analysis of Climate Change Impacts on Tourism
Reyer GERLAGH: A Climate-Change Policy Induced Shift from Innovations in Energy Production to Energy Savings
Elisatos PAPYRAKIS and Reyer GERLAGH: Natural Resources, Innovation, and Growth
Bernardo BORTOLOTTI and Mara FACCIO: Reluctant Privatization
Riccardo SCARPA and Mara THIENE: Destination Choice Models for Rock Climbing in the Northeast Alps: A Latent-Class Approach Based on Intensity of Participation
Santiago J. RUBIO: On Capturing Oil Rents with a National Excise Tax Revisited
Ascensión ANDINA DÍAZ: Political Competition when Media Create Candidates’ Charisma
Anna ALBERINI: Robustness of VSL Values from Contingent Valuation Surveys
Maria ALBERINI: Marginal Abatement Cost Curves in General Equilibrium: The Influence of World Energy Prices
Suzanne ATHEY, Jonathan LEVIN and Enrique SEIRA: On the Incidence of Commissions in Auction Markets
Patrick BAJARI, Stephanie HOUGHTON and Steven TADELIS: Optimal Procurement Auction for a Buyer with Downward Sloping Demand: More
Peter BAJARI, Stephanie HOUGHTON and Steven TADELIS: Bidder Behavior in Incomplete Markets
John ASKER and Estelle CANTILLON: Quid Pro Quo in IPOs: Why
François DEGEORGE, François DERRIEN and Kent L. WOMACK: How to Win Twice at an Auction. On the Incidence of Commissions in Auction Markets
Barbara BUCHNER and Silvia DALL’OLIO: Russia: The Long Road to Ratification. Internal Institutions and Pressure Groups in the Kyoto Protocol’s Adoption Process
Carlo CARRARO and Marzio GALEOTTI: Does Endogenous Technical Change Make a Difference in Climate Policy Analysis? A Robustness Exercise with the FEEM-RICE Model
Alejandro M. MANELLI and Daniel R. VINCENT: Multidimensional Mechanism Design: Revenue Maximization and the Multiple-Good Monopoly
Nicola ACOCELLA, Giovanni Di BARTOLOMEO and Wilfried PAUWELS: Is there any Scope for Corporatism in Stabilization Policies?
Johan EYCKMANS and Michael FINUS: An Almost Ideal Sharing Scheme for Coalition Games with Externalities
Cesare DOSI and Michele MORETTO: Environmental Innovation, War of Attrition and Investment Grants
<table>
<thead>
<tr>
<th>CCMP</th>
<th>157.2004</th>
<th>Valentina BOSETTI, Marzio GALEOTTI and Alessandro LANZA: How Consistent are Alternative Short-Term Climate Policies with Long-Term Goals?</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETA</td>
<td>159.2004</td>
<td>William BROCK and Anastasios XEPAPADEAS: Spatial Analysis: Development of Descriptive and Normative Methods with Applications to Economic-Ecological Modelling</td>
</tr>
<tr>
<td>KTHC</td>
<td>160.2004</td>
<td>Alberto PETRUCCI: On the Incidence of a Tax on PureRent with Infinite Horizons</td>
</tr>
<tr>
<td>IEM</td>
<td>161.2004</td>
<td>Xavier LABANDEIRA, José M. LABEAGA and Miguel RODRIGUEZ: Microsimulating the Effects of Household Energy Price Changes in Spain</td>
</tr>
</tbody>
</table>

### NOTE DI LAVORO PUBLISHED IN 2005

<table>
<thead>
<tr>
<th>CCMP</th>
<th>1.2005</th>
<th>Stéphane HALLEGATTE: Accounting for Extreme Events in the Economic Assessment of Climate Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>CCMP</td>
<td>2.2005</td>
<td>Qiang WU and Paulo Augusto NUNES: Application of Technological Control Measures on Vehicle Pollution: A Cost-Benefit Analysis in China</td>
</tr>
<tr>
<td>CCMP</td>
<td>3.2005</td>
<td>Andrea BIGANO, Jacqueline M. HAMILTON, Maren LAU, Richard S.J. TOL and Yuan ZHOU: A Global Database of Domestic and International Tourist Numbers at National and Subnational Level</td>
</tr>
<tr>
<td>CCMP</td>
<td>4.2005</td>
<td>Andrea BIGANO, Jacqueline M. HAMILTON and Richard S.J. TOL: The Impact of Climate on Holiday Destination Choice</td>
</tr>
<tr>
<td>ETA</td>
<td>5.2005</td>
<td>Hubert KEMPF: Is Inequality Harmful for the Environment in a Growing Economy?</td>
</tr>
<tr>
<td>CCMP</td>
<td>9.2005</td>
<td>Angelo ANTOCI: Environmental Resources Depletion and Interplay Between Negative and Positive Externalities in a Growth Model</td>
</tr>
<tr>
<td>NRM</td>
<td>11.2005</td>
<td>Francesco SINDICO: The GMO Dispute before the WTO: Legal Implications for the Trade and Environment Debate</td>
</tr>
<tr>
<td>PRCG</td>
<td>14.2005</td>
<td>Clara GRAZIANO and Annalisa LUPORINI: Ownership Concentration, Monitoring and Optimal Board Structure</td>
</tr>
<tr>
<td>CSRM</td>
<td>15.2005</td>
<td>Parashar KULKARNI: Use of Ecolabels in Promoting Exports from Developing Countries to Developed Countries: Lessons from the Indian LeatherFootwear Industry</td>
</tr>
<tr>
<td>KTHC</td>
<td>16.2005</td>
<td>Adriana DI LIBERTO, Roberto MURA and Francesco PIGLIARU: How to Measure the Unobservable: A Panel Technique for the Analysis of TFP Convergence</td>
</tr>
<tr>
<td>KTHC</td>
<td>17.2005</td>
<td>Alireza NAGHAVI: Asymmetric Labor Markets, Southern Wages, and the Location of Firms</td>
</tr>
<tr>
<td>KTHC</td>
<td>18.2005</td>
<td>Alireza NAGHAVI: Strategic Intellectual Property Rights Policy and North-South Technology Transfer</td>
</tr>
<tr>
<td>KTHC</td>
<td>19.2005</td>
<td>Mombert HOPPE: Technology Transfer Through Trade</td>
</tr>
<tr>
<td>PRCG</td>
<td>20.2005</td>
<td>Roberto ROSON: Platform Competition with Endogenous Multithoming</td>
</tr>
<tr>
<td>CCMP</td>
<td>21.2005</td>
<td>Barbara BUCHNER and Carlo CARRARO: Regional and Sub-Global Climate Blocs. A Game Theoretic Perspective on Bottom-up Climate Regimes</td>
</tr>
<tr>
<td>CTN</td>
<td>23.2005</td>
<td>Michael PINUS, Pierre v. MOUCHE and Bianca RUNDSHAGEN: Uniqueness of Coalitional Equilibria</td>
</tr>
<tr>
<td>SIEV</td>
<td>26.2005</td>
<td>Massimiliano MAZZANTI and Anna MONTINI: The Determinants of Residential Water Demand Empirical Evidence for a Panel of Italian Municipalities</td>
</tr>
<tr>
<td>CCMP</td>
<td>27.2005</td>
<td>Laurent GILOTTE and Michel de LARA: Precautionary Effect and Variations of the Value of Information</td>
</tr>
<tr>
<td>NRM</td>
<td>29.2005</td>
<td>Paul SARFO-MENSAH: Exportation of Timber in Ghana: The Menace of Illegal Logging Operations</td>
</tr>
<tr>
<td>CCMP</td>
<td>30.2005</td>
<td>Andrea BIGANO, Alessandra GORIA, Jacqueline HAMILTON and Richard S.J. TOL: The Effect of Climate Change and Extreme Weather Events on Tourism</td>
</tr>
<tr>
<td>NRM</td>
<td>31.2005</td>
<td>Maria Angeles GARCIA-VALINAS: Decentralization and Environment: An Application to Water Policies</td>
</tr>
<tr>
<td>NRM</td>
<td>32.2005</td>
<td>Chiara D’ALPAOS, Cesare DOSI and Michele MORETTO: Concession Length and Investment Timing Flexibility</td>
</tr>
<tr>
<td>CCMP</td>
<td>33.2005</td>
<td>Joseph HUBER: Key Environmental Innovations</td>
</tr>
<tr>
<td>CTN</td>
<td>34.2005</td>
<td>Antoni CALVÓ-ARMENGOL and Rahmi İLKILIÇ (lxxii): Pairwise-Stability and Nash Equilibria in Network Formation</td>
</tr>
<tr>
<td>CTN</td>
<td>35.2005</td>
<td>Francesco FERI (lxxii): Network Formation with Endogenous Decay</td>
</tr>
<tr>
<td>CTN</td>
<td>36.2005</td>
<td>Frank H. PAGE, Jr. and Myrna H. WOODERS (lxxii): Strategic Basins of Attraction, the Farsighted Core, and Network Formation Games</td>
</tr>
</tbody>
</table>
Alessandra CASELLA and Nobuyuki HANAKI (lxii): Information Channels in Labor Markets, On the Resilience of Referral Hiring
Matthew O. JACKSON and Alison WATTS (lxii): Social Games: Matching and the Play of Finitely Repeated Games
Anna BOGOMOLNAIA, Michel LE BRETON, Alexei SAVVATEEV and Shlomo WEBER (lxii): The Egalitarian Sharing Rule in Provision of Public Projects
Francesco FERRI: Stochastic Stability in Network with Decay
Aart de ZEEUW (lxii): Dynamic Effects on the Stability of International Environmental Agreements
Carla VIEIRA and Ana Paula SERRA: Abnormal Returns in Privatization Public Offerings: The Case of Portuguese Firms
Anna ALBERINI, Valentina ZANATTA and Paolo ROSATO: Combining Actual and Contingent Behavior to Estimate the Value of Sports Fishing in the Lagoon of Venice
Michael FINUS and Bianca RUNDSHAGEN: Participation in International Environmental Agreements: The Role of Timing and Regulation
Lorenzo PELLEGRINI and Reyer GERLAGH: Are EU Environmental Policies Too Demanding for New Members States?
Matteo MANERA: Modeling Factor Demands with SEM and VAR: An Empirical Comparison
Ana MÂULEON, José SEMPERE-MONERRIS and Vincent J. VANNETELBOSCH (lxii): A Characterization of Stochastically Stable Networks
Carlo CARRARO, Johan EYCKMANS and Michael FINUS: Optimal Transfers and Participation Decisions in Among Unionized Firms
Carlo CARRARO, Johan EYCKMANS and Michael FINUS: R&D Networks
Valeria GATTA: From the Theory of the Firm to FDI and Internationalisation: A Survey
Alessandra del BOCA, Marzio GALEOTTI, Charles P. HIMMELBERG and Paola ROTA: Economic Valuation of On Site Material Damages of High Water on Economic Activities based in the City of Venice: Results from a Dose-Response-Expert-Based Valuation Approach
Alessandra del BOCA, Marzio GALEOTTI, Charles P. HIMMELBERG and Paola ROTA: Investment and Time to Plan: A Comparison of Structures vs. Equipment in a Panel of Italian Firms
Gernot KLEPPER and Sonja PETERSON: Emissions Trading, CDM, JI, and More – The Climate Strategy of the EU
Maia DAVID and Bernard SINCLAIR-DESIGNÉ: Environmental Regulation and the Eco-Industry
Aileen-Désiré NIMUBONA and Bernard SINCLAIR-DESIGNÉ: From the Theory of the Firm to FDI and Internalisation: A Survey
Margaretha BREIL, Grettel GAMBARELLI and Paulo A.L.D. NUNES: Environmental Innovations: Institutional Impacts on Co-operations for Sustainable Development
Dimitra VOUVAKI and Anastasios XEPAPADEAS: Criteria for Assessing Sustainable Development: Theoretical Issues and Empirical Evidence for the Case of Greece
Andreas LÖSCHEL and Dirk T.G. RÜBBELKE: Impure Public Goods and Technological Interdependencies
Christoph A. SCHALTEGGER and Benno TORGLER: Trust and Fiscal Performance: A Panel Analysis with Swiss Data
Irene VALSECCHI: A Role for Instructions
Valentina BOSETTI and Gianni LOCATELLI: A Data Envelopment Analysis Approach to the Assessment of Natural Parks’ Economic Efficiency and Sustainability. The Case of Italian National Parks
Arianne T. de BLAEIJ, Paulo A.L.D. NUNES and Jeroen C.J.M. van den BERGH: Modeling ‘No-choice’ Responses in Attribute Based Valuation Surveys
Carlo CARRARO, Carmen MARCHIORI and Alessandra SGABBI: Applications of Negotiation Theory to Water Issues
Carlo CARRARO, Carmen MARCHIORI and Alessandra SGABBI: Advances in Negotiation Theory: Bargaining, Coalitions and Fairness
Sandra WALLMAN (lxvi): Network Capital and Social Trust: Pre-Conditions for ‘Good’ Diversity?
Asimina CHRISTOFOROU (lxvi): On the Determinants of Social Capital in Greece Compared to Countries of the European Union
Eric M. USLANER (lxvi): Varieties of Trust
Grazialetta BERTOCCHI and Chiara STROZZI: Environmental Regulation and the Eco-Industry
Helmut KARL, Antje MÖLLER, Ximena MATUS, Edgar GRANDE and Robert KAISER: Economic Valuation of On Site Material Damages of High Water on Economic Activities based in the City of Venice: Results from a Dose-Response-Expert-Based Valuation Approach
Dimitra VOUVAKI and Anastasios XEPAPADEAS: Criteria for Assessing Sustainable Development: Theoretical Issues and Empirical Evidence for the Case of Greece
<table>
<thead>
<tr>
<th>Journal</th>
<th>Volume</th>
<th>Year</th>
<th>Authors</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRM</td>
<td>116.2005</td>
<td>2005</td>
<td>Dan HOLLAND and Kurt SCHRÖDER</td>
<td>Protecting Marine Biodiversity: A Comparison of Individual Habitat Quotas (IHQs) and Marine Protected Areas</td>
</tr>
<tr>
<td>PRCG</td>
<td>117.2005</td>
<td>2005</td>
<td>John NELLIS</td>
<td>The Evolution of Enterprise Reform in Africa: From State-owned Enterprises to Private Participation in Infrastructure — and Back?</td>
</tr>
<tr>
<td>PRCG</td>
<td>118.2005</td>
<td>2005</td>
<td>Bernardo BORTOLOTTI</td>
<td>Italy's Privatization Process and Its Implications for China</td>
</tr>
<tr>
<td>SIEV</td>
<td>119.2005</td>
<td>2005</td>
<td>Anna ALBERINI, Marcella VERONESI and Joseph C. COOPER</td>
<td>Detecting Starting Point Bias in Dichotomous-Choice Contingent Valuation Surveys</td>
</tr>
<tr>
<td>CTN</td>
<td>120.2005</td>
<td>2005</td>
<td>Federico ECHENIQUE and Mehmet B. YENMEZ</td>
<td>Protecting Marine Biodiversity: A Comparison of Individual Habitat Quotas (IHQs) and Marine Protected Areas</td>
</tr>
<tr>
<td>KTHC</td>
<td>121.2005</td>
<td>2005</td>
<td>Valeria GATTAI and Corrado MOLLEN</td>
<td>Dissipation of Knowledge and the Boundaries of the Multinational Enterprise</td>
</tr>
<tr>
<td>KTHC</td>
<td>122.2005</td>
<td>2005</td>
<td>Valeria GATTAI</td>
<td>Firm's Intangible Assets and Multinational Activity: Joint-Venture Versus FDI</td>
</tr>
<tr>
<td>CCMP</td>
<td>123.2005</td>
<td>2005</td>
<td>Federico ECHENIQUE and Mehmet B. YENMEZ</td>
<td>Dissipation of Knowledge and the Boundaries of the Multinational Enterprise</td>
</tr>
<tr>
<td>CCMP</td>
<td>124.2005</td>
<td>2005</td>
<td>Valeria GATTAI</td>
<td>Firm's Intangible Assets and Multinational Activity: Joint-Venture Versus FDI</td>
</tr>
<tr>
<td>CCMP</td>
<td>125.2005</td>
<td>2005</td>
<td>Socrates KYPREOS</td>
<td>A MERGE Model with Endogenous Technological Change and the Cost of Carbon Stabilization</td>
</tr>
<tr>
<td>CCMP</td>
<td>126.2005</td>
<td>2005</td>
<td>Raphaël SOUBEYRAN</td>
<td>Political Cycles: The Opposition Advantage</td>
</tr>
<tr>
<td>PRCG</td>
<td>127.2005</td>
<td>2005</td>
<td>Valeria GATTAI</td>
<td>Dissipation of Knowledge and the Boundaries of the Multinational Enterprise</td>
</tr>
<tr>
<td>PRCG</td>
<td>128.2005</td>
<td>2005</td>
<td>Valeria GATTAI</td>
<td>Dissipation of Knowledge and the Boundaries of the Multinational Enterprise</td>
</tr>
<tr>
<td>CCMP</td>
<td>129.2005</td>
<td>2005</td>
<td>Fredrik HEDENUS, Christian AZAR and Kristian LINDGREN</td>
<td>Induced Technological Change in a Limited Foresight Optimization Model</td>
</tr>
<tr>
<td>CCMP</td>
<td>130.2005</td>
<td>2005</td>
<td>John NELLIS</td>
<td>Privatization in Africa: What has happened? What is to be done?</td>
</tr>
<tr>
<td>SIEV</td>
<td>132.2005</td>
<td>2005</td>
<td>Giovanni DI BARTOLOMEO and Nicola ACOCELLA</td>
<td>Tinbergen and Theil Meet Nash: Controllability in Policy Games</td>
</tr>
<tr>
<td>ETA</td>
<td>134.2005</td>
<td>2005</td>
<td>Giovanni DI BARTOLOMEO and Nicola ACOCELLA</td>
<td>Tinbergen and Theil Meet Nash: Controllability in Policy Games</td>
</tr>
</tbody>
</table>
### 2004 SERIES

| CCMP       | Climate Change Modelling and Policy (Editor: Marzio Galeotti) |
| GG         | Global Governance (Editor: Carlo Carraro) |
| SIEV       | Sustainability Indicators and Environmental Valuation (Editor: Anna Alberini) |
| NRM        | Natural Resources Management (Editor: Carlo Giupponi) |
| KTHC       | Knowledge, Technology, Human Capital (Editor: Gianmarco Ottaviano) |
| IEM        | International Energy Markets (Editor: Anil Markandya) |
| CSRM       | Corporate Social Responsibility and Sustainable Management (Editor: Sabina Ratti) |
| PRA        | Privatisation, Regulation, Antitrust (Editor: Bernardo Bortolotti) |
| ETA        | Economic Theory and Applications (Editor: Carlo Carraro) |
| CTN        | Coalition Theory Network |

### 2005 SERIES

| CCMP       | Climate Change Modelling and Policy (Editor: Marzio Galeotti) |
| SIEV       | Sustainability Indicators and Environmental Valuation (Editor: Anna Alberini) |
| NRM        | Natural Resources Management (Editor: Carlo Giupponi) |
| KTHC       | Knowledge, Technology, Human Capital (Editor: Gianmarco Ottaviano) |
| IEM        | International Energy Markets (Editor: Anil Markandya) |
| CSRM       | Corporate Social Responsibility and Sustainable Management (Editor: Sabina Ratti) |
| PRCG       | Privatisation Regulation Corporate Governance (Editor: Bernardo Bortolotti) |
| ETA        | Economic Theory and Applications (Editor: Carlo Carraro) |
| CTN        | Coalition Theory Network |